The Green Neighbor Challenge:
An Effort Towards Collective Climate Action

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Table of Contents

Abstract

This paper describes a yearlong effort to bring to life a web-based tool to assist any US utility customer in finding and signing up for renewable electricity through either green pricing programs or green competitive suppliers. Further, it describes efforts to design a complementary social media campaign that publicly celebrates the private choice of users to subscribe to green electricity. Together, the integrated tool and campaign are referred to as the *Green Neighbor Challenge*. Quantitative and qualitative research informed an iterative, creative development process that remains ongoing. In partnership with dozens of organizations, we aim to double the current green pricing subscription rate of 2% to 4%, converting a million households and reframing the national climate conversation. With key challenges overcome and modest funding in tow, the Green Neighbor Challenge is expected to be operational by January, 2020. These efforts have sprouted from the belief that through action, we create hope; and through collective action, just and sustainable futures become possible. Will you join us?

Introduction

At least 86% of US consumers are unaware of their ability to purchase electricity from renewable power sources, yet over 70% have the ability to do so.[i] Of those who are aware, there is considerable confusion over how to sign up, what the costs are, and whether they're even enrolled. This is partly because regulated utilities (which serve the bulk of US residents) are either required or pressured to offer the option, but have no financial incentive to market these programs, nor make signing up easy to do.

Empirically, just 2% of those eligible for a "green pricing program" (which allows consumers to pay a small monthly surcharge for renewable electricity) have subscribed. However, top performing programs (which are almost exclusively run by municipally-owned utilities) show subscription rates as high as 20%.[ii] As prices for these programs have fallen to the point where the average home on the average program can now source 100% renewable electricity for under $10 a month, academic research suggests up to 40% of homes are willing to pay.[iii] However, as the National Renewable Energy Lab (NREL) notes, "electricity is such a low involvement category… consumers do not deliberate this decision extensively (if at all) or experience any consequences of

their decision." The Green Neighbor Challenge addresses these twin problems of "lack of awareness" and "indifference." [For a historical view of green pricing policy, see Appendix D: Policy Context]

The Green Neighbor Challenge is both a "tool" and a "campaign."

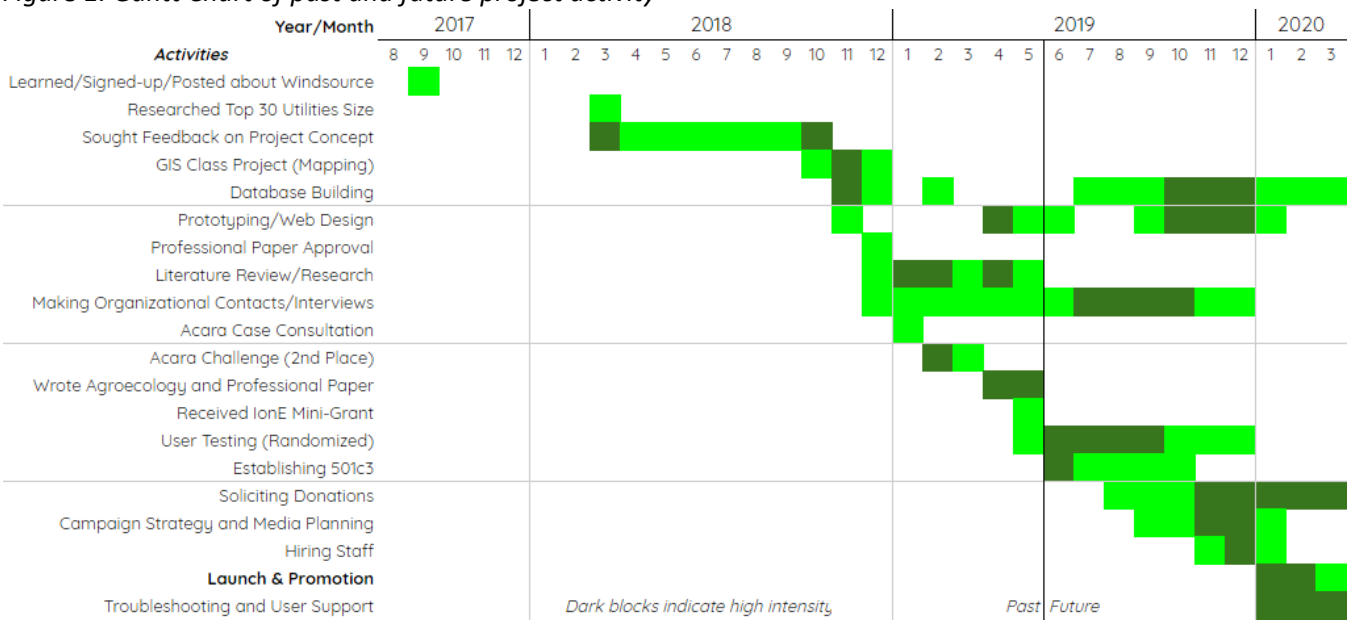
The Green Neighbor Challenge (GNC) is a website that serves as an information index that electric consumers can use to find green energy programs to purchase renewably sourced electricity from. The GNC is thus a tool in the way that Google or a phone book are tools. Built upon a national database of green pricing programs and green "competitive suppliers" (which, in certain markets, serve as an alternative energy provider to the default, or "standard offer," utility), the GNC quickly connects consumers to the green energy programs they are eligible for with as little as a zip code. Going further, it provides quick insights to the tradeoffs between programs (if there are multiple) and then offers step-by-step instructions on how to sign up, including hyperlinks. When the user is done signing up (or otherwise done reviewing the process), they are then able to share the web-tool with their networks across a variety of social media platforms. Finally, for the most enthusiastic users, the GNC presents them with a suite of optional follow-up actions and resources which they are invited to explore before they go. [For a more in-depth explanation of the tool, see Appendix H: Tool Design]

The GNC is a campaign in the way that the Ice Bucket Challenge (ALS Awareness social media campaign) or Drunk Driving Prevention ("Friends don't let friends drive drunk") are campaigns. They aim to both raise awareness and encourage action. The GNC is more similar to the Ice Bucket Challenge, in that the center of activity will be online and across social media platforms, though like more traditional public service campaigns it will originate from a single organization (acting in conjunction with a team of allied organizations). There will be a coordinated public launch of the campaign, relying on a variety of non-profits, for-profits, governmental bodies (such as metro cities/counties), and news/educational outlets to generate an initial burst of traffic which will hopefully accelerate through peer-to-peer sharing and word of mouth. [For more on our existing connections, see Appendix E: Organizational Connections] If enough attention is generated, we anticipate that media coverage will spill over to print and TV, helping the service reach those who are not active social media

users. This will be a planned contingency, with a press-packet made ready in advance. If the campaign succeeds, we anticipate seeing 80% of the activity within a 2-3 month window, and the remaining usage spread out over a long tail of 3-6 years.[iv] This timeframe is a reflection of the general public's attention span, the persistent nature of a green pricing subscription (staying in place until a person either cancels their service or moves), as well as the changing economics of green energy programs (which will eventually merge with standard energy service, hopefully sooner rather than later).

Figure 1 shows the range of activities over time that have been required, and will be required to prepare for the launch in January. Dark blocks indicate a high intensity in a given activity, and the next six months will require both a widening and deepening of efforts to include all desired features in time. After the launch, activities will quickly settle down into a routine of promotion, updates, support, and donations over the long tail.

Figure 1. Gantt Chart of past and future project activity



Importance

The GNC is a human-centered and human-powered solution. This is in direct contrast to an industry or policy-centered solution. This is because 100 companies are responsible for 71% of global emissions since 1988.[v] This is also because Renewable Portfolio Standards (requiring utilities to include a percentage of renewable energy in their mix) and Green New Deal legislation exists even as sympathetic, donor-dependent politicians wring their

hands and bemoan the collective delusion of “political feasibility.” Many regard corporations and politicians as the key to change, but the GNC aims to awaken the power of all the ordinary people being left behind.

The GNC is the first-ever national database and campaign to purchase clean, renewable energy. Its key breakthrough was in connecting publicly available datasets to generate utility service territories at the zip code level for over 2000 utilities. Customer data revealed half the US population could in fact be reached with just 46 programs or suppliers. Fortunately the National Renewable Energy Labs had started a list of 522 of the estimated 850+ programs that exist. With this as a foundation, the database will also include key program details such as cost, composition, contract length, and finally, step-by-step instructions on how to sign up. [For more about how the database is being constructed, see Appendix A: Building A Database]

Scope of GNC

The GNC is national in scale, and extends itself to Green Pricing Programs and Green Competitive Suppliers. It is primarily designed for residential customers and small to medium commercial outfits.

The national scale of the GNC is made possible through the electric rate data collected by the National Renewable Energy Lab (NREL) as organized by OpenEI, an organization dedicated to energy information transparency. Given our social-media-based approach, this national scale is a critical enabler. Networks gain their greatest efficiencies not through proximate, strong linkages, but by distant, loose linkages. For example, the ability of a message to spread increases little more than 1:1 as family and close friends who all know each other are added, but when acquaintances from college who live on the other side of the country and share few mutual connections are included, the possibilities grow exponentially. These clustered networks are known as “small-world” networks and their loose links are the key to “virality.” This is also why a local or regional pilot isn’t being conducted: Users are expected to interact with the GNC only once. Just as forest fires can’t backtrack, and people develop an immunity to recent infections, social networks too exhibit a type of exhaustion/immunity period.[vi]

There are seven known ways to voluntarily purchase renewable energy, but the GNC focuses on just two: Green Pricing Programs (GPP) and Green Competitive Suppliers (GCS). They are functionally two sides of the same coin, in that both are ways of purchasing green electricity from your power provider, often at a small surcharge tied to your consumption and put directly on your monthly bill. However GPPs exist in regulated markets, where the consumer has only one utility to choose from. GCSs exist in "deregulated" or competitive markets where consumers can opt out of the "standard offer" utility to get their electricity from a different company. These companies are known as competitive suppliers (since they do not manage the grid), and only a minority of them (~2%) sell green energy,[vii] but those that do typically specialize in it. About 75% of households are in regulated markets (GPPs) and 25% are in deregulated markets (GCSs).[viii] So including both is critical to maintaining a national scope. [For more on the market context and other voluntary procurement options, see Appendix B: Market Context].

Finally, informed by the inclusion of GPPs and GCSs, the GNC is primarily designed for residential and small-medium commercial customers. An additional advantage of this design is that anyone with a utility bill is eligible to participate, not simply homeowners (particularly those with a roof) or those with upfront investment capital (as is often required for residential solar or community solar). Since renters represent 35% of the population (a majority of those age 20-32)[ix] and 40% of Americans don't even have $400 saved in the case of a medical emergency,[x] the GNC focuses on programs accessible to the populations most impacted by climate change and pollution (the young and the wealth-less).

Rationale for Collective Action

While large corporations[xi] and the wealthy[xii] are primarily responsible for climate change, and thus the costs of policy interventions should be borne by them, they are the two most powerful political constituencies, to the point where ordinary Americans' effect on public policy is "near zero."[xiii] Despite the prevailing economic dogma asserting the "efficiency" of markets, reasonable observers have known that unimpeded human markets (often defended under the banner of "Green Capitalism,"[xiv] or derided under "Disaster Capitalism,"[xv]) do not act

sustainably and inevitably lead to the "overshoot and collapse" of natural resource stocks. The Club of Rome empirically demonstrated as much in 1972's *Limits to Growth (and three subsequent 10-year updates),* and such modeling continues to be confirmed today with the even more robust Earth3 model.[xvi] Of course, the tradition of collapse denial has been vibrant since the days of Malthus, despite the many lessons in history.[xvii] While many suggest efforts would be better directed towards politicians or corporations, a deep and unflinching power analysis of American politics reveals that only through durable and vocal coalitions of citizens will real systems change become possible. [For more responses to common concerns, see Appendix J: Potential Criticisms]

This is a campaign about creating hope through collective action: Climate grief and climate anxiety are becoming clinically accepted terms. Our grief and our anxiety come from our sense of alienation and powerlessness. In *Hope in the Dark,* which helped me weather the discouragement of others in the weeks before committing to this project, Rebecca Solnit writes, "Hope is an embrace of the unknown and the unknowable, an alternative to the certainty of both optimists and pessimists. Optimists think it will all be fine without our involvement; pessimists take the opposite position; *both excuse themselves from acting*." We don't have to wait for the next election. Nor do we have to struggle as disorganized individuals to change a dozen habits, buy all new appliances, and live without heat to eliminate a third of our emissions. We have been misled.[xviii] Five minutes of time and less than $10 a month can accomplish the same feat. So cutting US emissions 45% in 11 years is neither impossible, nor prohibitively expensive. When we take action, we reclaim our power. When we do it together, our power becomes hope. (Even the research says so!)[xix,xx]

This is a campaign about creating new political possibilities: Erica Chenoweth and Maria Stephan demonstrated that out of over 300 violent and non-violent governmental change efforts, every campaign that had active participation from 3.5% of the population succeeded, many with less.[xxi] Indeed, the perceived ubiquity of the Ice Bucket Challenge on social media in 2014 becomes astonishing when across Facebook only 2.4 million videos were shared internationally,[xxii] and only 2.5 million donations were made to the ALS Foundation by US residents.[xxiii] Well under 1% of the US population took action, yet the event crossed over to TV, print news, and the collective consciousness nonetheless. The Occupy protests, lasting only two months and garnering under

two million mentions or hashtags on twitter,[xxiv] have nonetheless shaped the political discourse of the last decade by introducing the concept of the "99%." While the GNC is more political than the former, and less involved than the latter, it is no less a public demonstration of values for politicians and corporations to bear witness to. The aim is to shift the so-called "Overton Window," or window of tolerable discourse. As green legislation struggles to escape timid legislative committees the whole country over, a clear climate mandate is needed to give sympathetic politicians the courage to put them up for votes. The GNC is not a substitute for voting, nor policy change, nor direct action, nor community organizing, but instead is aimed at energizing all four. As Frederick Douglass stated, "Power concedes nothing without a demand, it never did and it never will." So let us demonstrate the simplicity of our demand.

Social Media Framework

While the very first concept of the GNC was to simply release a shareable map on the internet (with crossed fingers), the approach to the tool and campaign have grown substantially more robust: More than a just a map or database, the GNC is an interactive walkthrough that not only explains the programs you're eligible for, but leads you through the sign-up process without collecting personal information. Nesting this tool within a social media campaign allows a traditionally private decision with public benefits to be socially acknowledged and rewarded by a person's peer group. Challenging friends and family then generates a playful social tension which encourages them to overcome their behavioral inertia and purchase energy in alignment with their values too.

The campaign is being designed around five mutually reinforcing concepts: *Storytelling* (making the science "present," focus on shared values/experiences), *Social Identity* (decentralizing the campaign through trusted messengers for varied subcultures), *Technology* (achieving scale & ease through social media and data), *Behavioral Economics* (ease of use, social tension, and opt-out), and *Spectacle* (anticipating public response, use of media allies). [For an in-depth explanation of each concept, see Appendix G: Campaign Strategies].

These concepts emerged through creative intuition and prior learning experiences, were iteratively refined through feedback from interviews, presentations, and a case consultation, and were finally firmed up by existing

literature on successful social media campaigns. One such study of the Ice Bucket Challenge[xxv] also settled on five concepts that bear a striking resemblance and overlap to our five concepts, with room to learn. It identified *social media marketing* (technology), *celebrities' influence* (spectacle), *online word-of-mouth phenomenon* (storytelling), *viral marketing* (social identity), and *right-timing marketing*. This last concept doesn't map as cleanly to the behavioral approaches the GNC is focused on, though this difference is reflective of the difference between the creative challenge of pouring ice water over oneself (during the hottest months, hence right-timing) and the design challenge of helping users navigate a labyrinth of arcane details to sign up for green energy. Other concepts were elaborated on in ways that will refine our concepts too, such as the included discussion of the role emotions like *fun* and *awe* play in the "style" of successful campaigns, which will help inform our approach to storytelling.

Potential

The GNC aims to make contributions to climate, pollution and health, and the economy. The goal is to turn the 2% GPP subscription rate into a 4% subscription rate (which should be realistic, since several municipal utilities have rates between 10-20%). Excluding GCSs for ease, a doubling of GPP subscription rates would convert nearly 1 million households over to green energy. This would convert the demand of ~8,850 GWh annually, which would be a 1.4% increase in US green generation. This amount of power represents two modern 600 MW coal plants or the 50 smallest coal-based utility generators (most of which were built in the 1940's and '50's).[xxvi] Further, an estimated $168 million would flow into the market for green energy, supporting 30 year investments many times larger in size. If the EPA findings that every dollar spent on air pollution abatement saved $30 in healthcare and lost productivity was roughly analogous,[xxvii] this could also lead to $5 billion in economic savings, not to mention the intrinsic value of health itself and keeping loved ones longer. Though Residential and Commercial electricity represent 20% of the carbon emissions pie today, they are expected to grow through electrification of transportation and heating sectors, more than doubling electricity's importance as we move towards 2050, so efforts made now will garner outsized returns going forward. [For more on the organizational

niche of the GNC, see Appendix C: Market Opportunity] [For more on the social and ecological impacts of the GNC, see Appendix I: Expected Impacts].

Challenges

Many of the most critical challenges have been overcome, though several challenges remain: First is finding an efficient process to amass and update the program details/sign-up steps of GPPs and GCS's. Second is finding a web designer, and working to integrate not only the database, but a suite of additional features deemed helpful either to users or to the venture in an easy and appealing manner. [For more on additional features, see Appendix F: Potential Expansions] Third will be in developing materials and relationships with developers and other beneficiaries that lead to donations, even before the service is launched, so as to afford staff. The fourth challenge, which is getting underway, is designing and conducting effective user testing that is able to properly inform challenges two and three. The fifth challenge will be in setting up the organization as a 501c3 non-profit entity capable of generating tax deductions for donors, though this should be a fairly straightforward process, even if the timeline is often variable. The sixth challenge will be in continuing to build organizational connections and creating buy-in for a coordinated social media launch. [For more on next steps, see Appendix K: Next Steps]

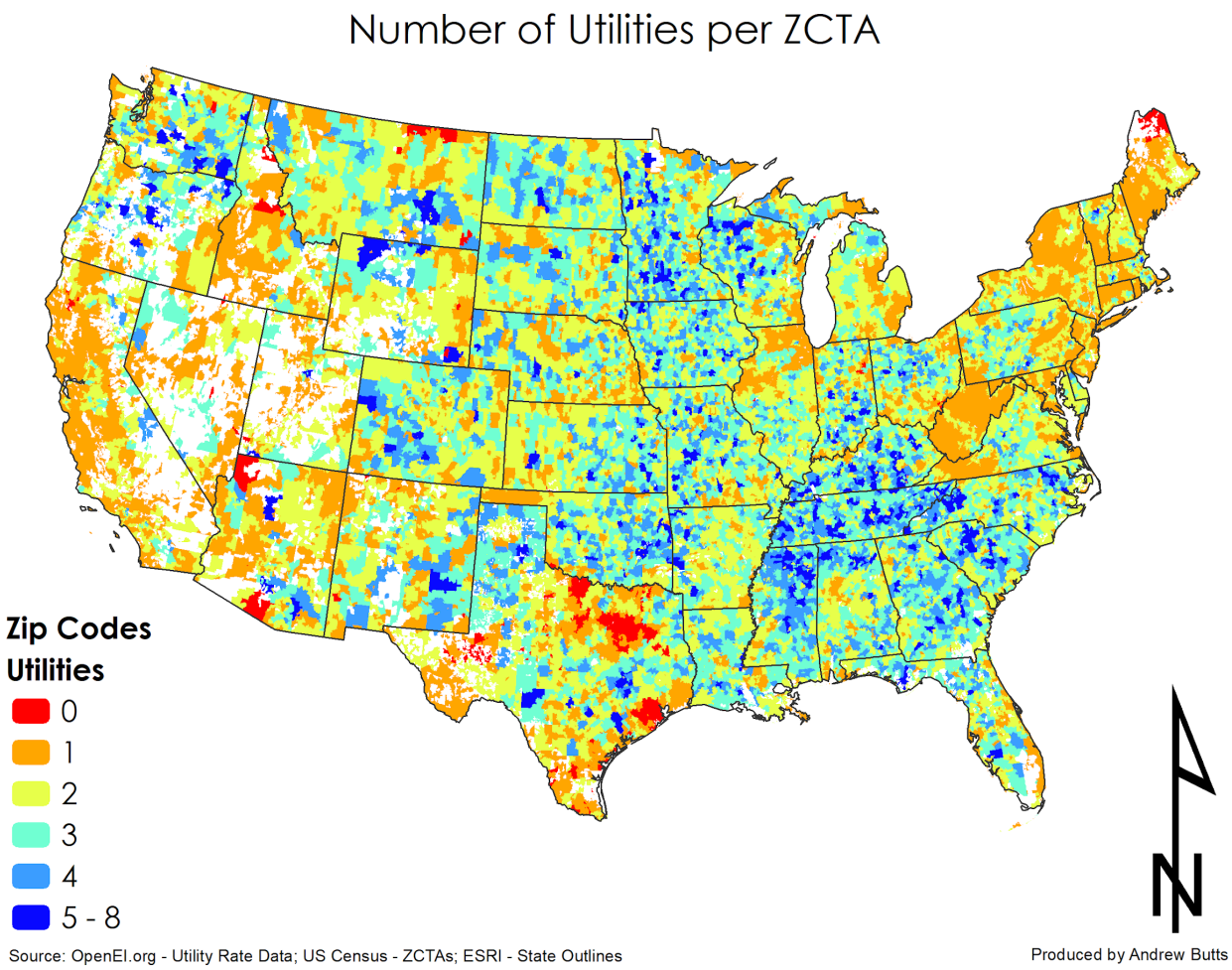
While some of these challenges will be difficult and may require creative improvisations, none seem insurmountable. Even without funding, for example, there are numerous ways to scale back the venture to its essentials and use crowdsourcing to assist with the research process. Many friends and family have already offered their assistance, seeing the promise in chasing this big idea. The biggest challenge may simply be in finding the capacity to coordinate all these efforts. Especially as bills and student debt intrude to remind us all that we live in an economic regime that prefers to profit off of social ills, than provide to those who would prevent them. Perhaps someday when all our energy is produced by the wind and sun, and most of our jobs have been automated away we'll come to value what actually matters -- family, friends, community, education, health, and the natural world.

Appendix A: Building a Database

To power the GNC, a database was required that could do several things: 1) make it easy for a customer to identify their utility 2) identify all (or most) of the programs a utility customer would be eligible for 3) include a quick rundown of key features such as price, composition, and restrictions and 4) provide step-by-step instructions on how to sign up using embedded hyperlinks. Beyond this, there were auxiliary research benefits in connecting additional data such as A) utility customers and sales and B) census demographics.

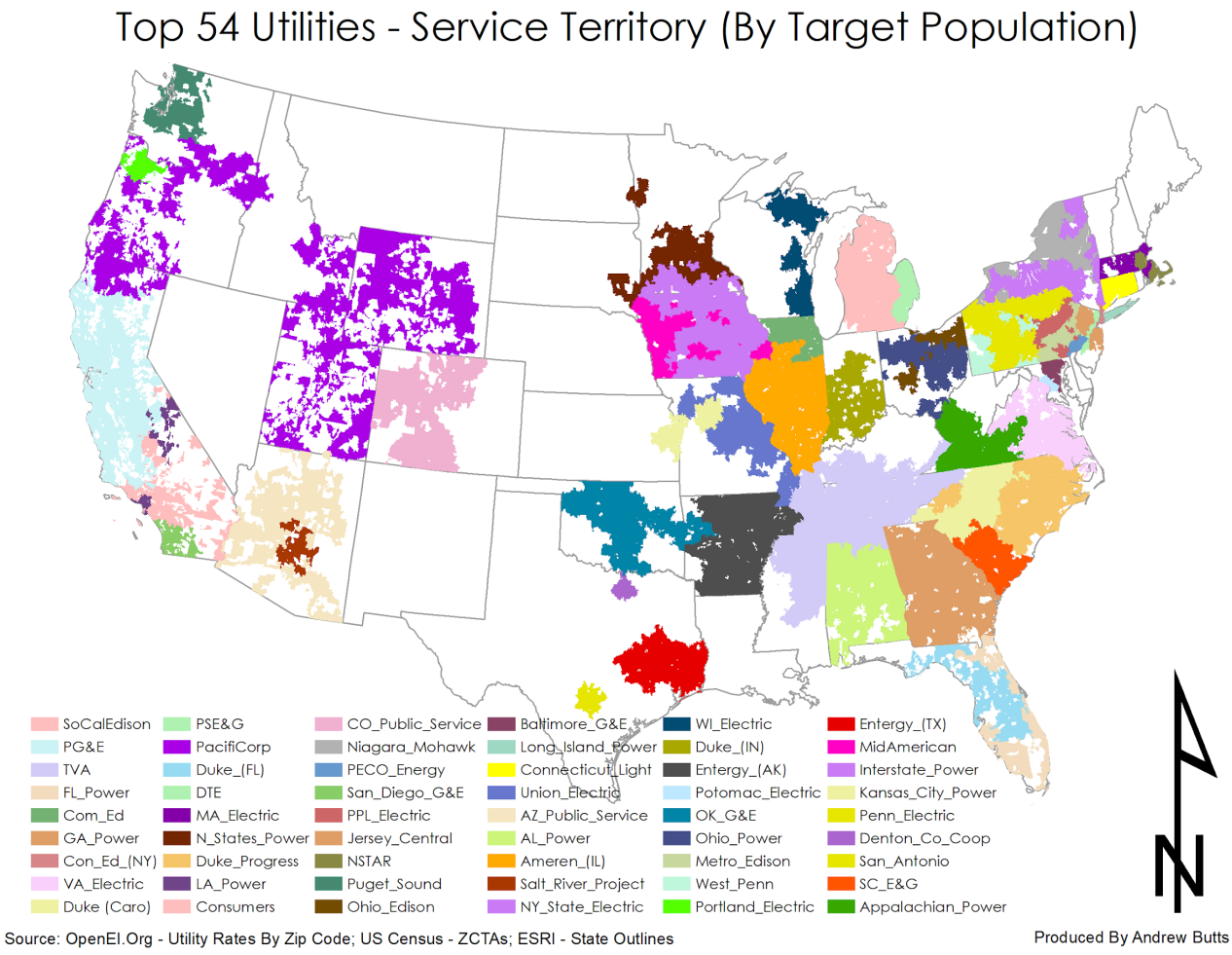
In order to make it easy for a customer to identify their utility it was important to use some sort of geographic information. This is because with over 2000 utilities in the US, not only is there considerable overlap in the names used (Consumers Power vs Consumers Electric), but even a single utility can use and be referred to by customers in a number of different ways, often because of legacy names, rebranding, and mergers (Wisconsin Electric vs "WE Energies" vs WEC Energy Group). While it was very quickly identified that getting utility service territories down to an address level would be impossible, it was also somewhat unnecessary since using zip codes, cities, or counties would be less personally invasive for users. Fortunately, the Utility Rate Database[xxviii] provided by OpenEI.Org and regularly updated by the National Renewable Energy Labs contains utility rates by zip code for nearly every recognized utility in the US. Where there is a rate, there is service. Though unfortunately, the converse is not always true. There are some areas of missing or underreported rates, particularly in deregulated market areas such as Texas, which will require further investigation, and may require a different approach to populate correctly (such as using EIA's county level service territory data[xxix]). Overall though, very few zip codes are left without any utility coverage in the data, with the Dallas-Fort Worth and Houston metro as the only notable exceptions, so it's a very nearly comprehensive dataset to start from and will allow most customers to find their utility with as little as their zip code. (See Figure 2)

Figure 2: Utility Density Map based on Utility Rate Database (By ZCTA = Zip Code Tabulated Area)



For the second database requirement, we turned directly to NREL which has collected a list of 522 green pricing programs, along with a variable amount of program details, though most include at least a URL, making them easy to find. This list they admit is not comprehensive, and is culled together from a combination of efforts. I have already begun building upon this list and identifying additional programs that were missing for the top 100 utilities by customers. I managed to prioritize them in this way by looking up the NREL GPP data against the customer and sales data from the Energy Information Agency's EIA-861 form. (See Figure 3) In order to do so required many hours of manual finagling of utility names to standardize them all. In doing so however, another 20-30 programs among the largest 100 utilities were able to be googled and added this way, and together the ~550 programs on the list should now reach 61% of US households. Given that NREL estimates closer to 850 programs exist, we expect a final list to reach 70%+.

Figure 3: Utility Service Territories (at zip code level) for 54 Largest Utilities



For collecting program details, no substantial effort has yet been undertaken, though some is already included in the NREL dataset, however out of date it may be. And in fact, the timeliness of the data is primary reason for the delay of these efforts. While most program data seems to be freely available on the sites I've browsed (even if in non-obvious techno-speak, or buried in term sheets), since the GNC will likely not be launching for at least six months, it seemed foolish to sink substantial effort into collecting program details such as price, energy composition, and contract length/restrictions when for many, those details may change by the new year. The NREL data demonstrated as much in it's Xcel Energy pricing data, which was perhaps a year old, but reflecting a higher price than I was now paying.

The final database requirement will be the trickiest, as it will likely need to be written out by attempting to go through the online sign-up process manually. This may be difficult to do in a satisfactory way if the sign-up

process requires a valid log-in. This is where prioritization will play a large role, as it may still be possible to email or call utilities to receive a written process explanation, though that increase the time demands of the research process. This is why for both program details and sign-up instructions, I plan to reach out to the many people (and some organizations) that have offered their assistance. The plan is to hold several “research parties” 2-3 months before launch to try and populate the data for as many programs as we are able. Many hands (and a grant-provided food budget) make light work.

Appendix B: Market Context

The United States is the 2nd largest emitter of GHGs in the world, behind China, generating around 5 Billion metric tons of carbon dioxide emissions in 2015. This was 15% of carbon emissions in the same year.[xxx] In addition, the United States' cumulative emissions since 1850 represent 20% global emissions, which further underlines the climate debt our country carries. This is despite the fact the US only represents 4.3% of the world population, and when measured on a per capita basis, the US slides a bit further down the list, but not by far. Saudi Arabia, Australia, and Canada each emit around 15 metric tons/person too, but with populations roughly 10% or less of our own.[xxxi] By comparison, Germany and Japan emit around 9, the UK and China around 6, while India, Indonesia, and Brazil are hovering all the way down around 1.5.[xxxii] Given our current level of economic development, the onus is strongly upon us to not only reduce our emissions massively, but to reduce them much sooner than countries who are still working on improving standards of living.

Within the US, energy is responsible for 84% of all GHG emissions. Dividing that further, electricity is tied with transportation, with each contributing 28% of US GHG's, collectively over half of all emissions.[xxxiii] Further, since electrification is largely assumed to be the easiest solution to decarbonizing both transportation[xxxiv] and heating[xxxv], it can be expected that 24 percentage points from transportation (of 28) and 8 percentage points from residential and commercial (of 11) will shift to electricity by 2050 (if we're lucky), making 52% of current GHG emissions dependent on the decarbonization path the electrical sector takes.[xxxvi] This is to say nothing of the Industrial sector (22% of US GHG), which is dominated by steel and concrete production, nor the Agricultural sector (9% of US GHG), which are both expected to struggle with decarbonization.[xxxvii] Indeed, the prospects of hydrogen-steel[xxxviii] and lab-grown meat[xxxix] would shift substantial portions of these sector's footprints over to electricity as well, however, to what degree is highly uncertain. Optimistically, this means that electricity alone may be able to drive the vast majority of the carbon reduction required by 2030, though pessimistically, it will very likely have to.

Within the electricity sector, green power sources currently represent 17% of all electricity sales, with the remaining 83% of electricity sales representing ~99% of all GHG emissions.[xl] Within green power sales, 74% are

associated with policy compliance (required by state renewable portfolio standards), and 26% are associated with voluntary procurement programs (purchased by businesses or individuals for non-regulatory reasons).[xli] The National Renewable Energy Laboratory has classified and tracks seven types of voluntary procurement. Utility Renewable Contracts, Unbundled Renewable Energy Certificates, and Power Purchase Agreements (PPAs) are almost exclusively used by large commercial and industrial outfits, and account for 68% of voluntary green energy, but 4% of voluntary green energy customers. The other four programs, Utility Green Pricing Programs (GPP), Competitive Suppliers, Community Choice Aggregations (CCAs), and Community Solar predominantly serve residential and small commercial consumers, and correspondingly account for 32% of voluntary green power and 96% of the customer base. While GPPs and Competitive Suppliers have steadily grown in sales and customers for a number of years, they have both shrunk as a proportion of the voluntary market as growth in PPAs and CCAs have outpaced them in recent years. Despite this, there are good reasons to believe these two program types have a large latent potential waiting to be exploited, which is discussed in more detail in the policy context below.

Taking a moment to define our target segment as residential and small commercial customers (since programs for them are standardized, and they can constitute a mass movement by sheer numbers), we can examine the market a bit differently. Residential and Commercial electricity together represent 72% of electrical demand, of which, they claim nearly equal shares.[xlii] Of the 151 million residential and commercial customers[xliii] in the US, 38 million[xliv] (or 25%) are able to sign up for a competitive supplier because they are in one of the 14 states with a deregulated electricity market. The remaining 75% may only receive their power from a single “standard offer” utility, which may or may not offer a GPP to customers. Among customers in a competitive market, 44% of eligible customers took service from a competitive supplier, however only about 2% of competitive supplier sales were for green power.[xlv] Among customers eligible to sign up for a GPP, participation rates averages around 2%, but GPP’s by their nature are 100% green.[xlvi] The average green power participant in both purchased about 10.5 MWh/year or about 872 kWh/month. This is nearly perfectly representative of the average US household which consumed 867 kWh per month.[xlvii] Together it can be said that currently green power

voluntarily procured through GPPs and Competitive Suppliers by residential and commercial customers represents around 1% of all electricity sales in the US.

Appendix C: Market Opportunity

What can be said of the opportunity to increase green power usage among residential and commercial customers? Looking within the participation data of GPP's and Competitive Suppliers reveals huge variability across programs, states, localities, and utilities. With over 850 GPPs in existence, participation rates average around 2%. Meanwhile, the top 10 programs have an average participation rate around 10%, and in fact, the top performing GPP clocks in just shy of 20% participation.[xlviii] While a distinguishing feature between the top 10 GPPs by participation rate and the top 10 GPPs by overall enrollment is sheer size (only 3 utilities appear on both lists), eight of the top ten participation rates belong to municipal or cooperative utilities. This is a significant, since the financial regulations placed on Investor-Owned Utilities (IOU's) typically prevent them from recovering costs associated with marketing. Municipal and cooperative utilities on the other hand are responsible either to their citizens or member-owners, giving them both more latitude and motivation to market voluntary programs to interested constituents.

In deregulated markets however, marketing by utilities is the norm, but consumers can be overwhelmed by the sometimes hundreds of options available to them, and as NREL notes, "new products may generate customer confusion that could, in some cases, reduce green power demand."[xlix] The aggressive marketing promoted by competition in deregulated markets can exacerbate this. Rising above the noise to provide green energy in these markets has required economies of scale, and indeed, only eight competitive suppliers across all 14 deregulated markets are responsible for over half of all competitive green power sales and virtually all of the growth in the last five years. Examining successful outliers across these diametrically opposed market structures underlines not only the need for reliable information, but for a reliable information broker the consumer can trust. NREL suggests regulators step up to "increase transparency through informational resources," but there is also no good reason why a third-party non-profit couldn't fill that same role, save that of financial viability.

Although GPPs are 100% green power without any chance of double-counting, much attention (and research) has shifted towards newer, lower-quality, somewhat/sometimes-green products such as CCA's (~20% green), Community Solar (~10% green), and Competitive Suppliers (~2% green). Fortunately the cost of producing green

energy has been plummeting rapidly over the last decade, helping to bring new buyers into the market, but the misinformation and distrust of consumers around green energy is still palpable in my numerous interactions over this project. While the non-profit, Green-e, exists to provide a reputational bonus to certified producers, it's influence is largely with industry rather than consumers. Other trade organizations exist within the renewable energy industry, but most seem confined to lobbying, conferences, or research.[l] The Green Neighbor Challenge will be providing an informational database and resources that help consumers and small businesses make informed decisions with confidence, as well as promoting only the highest quality programs available. In this way it will be solving a collective problem much like a trade organization, but without corporate membership.

The Green Neighbor Challenge will take the form of a 501c3 non-profit. This will enable us to solicit donations to fund our operations from organizations that stand to benefit, such as wind and solar developers, contractors, manufacturers, and trade associations without the strings or baggage typically associated with an investment. This will allow us to keep our values at the center of the tool's design, and preserve our integrity as an honest information broker for the people. Further, this will allow us far greater ability to partner with like-minded non-profits and leverage their platforms and resources for maximizing our reach and impact.

The most obvious and concentrated group of potential donors are renewable energy developers, but general contractors and even health insurers may be interested as well. Although the GNC is solving a commons problem where the benefits will be diffuse, since $168 million/year is at stake, we think it is possible to raise $500,000 to $1 million in the first year, largely in $20,000 to $50,000 donations. Even a budget of a $500,000 would support a staff of around six full-time equivalent employees including people to manage the web, data, donations, and press, though some positions will be split among part-time or temporary workers to help support the short-term surge of activity. Once things settle down, the GNC should be able to be maintained as a 2-person operation on substantially less.

Appendix D: Policy Context

To better understand why the market exists the way it does, we must turn to the historical policy context that has shaped the market.

Policy structured the market. In 1978, under the pen of Jimmy Carter, the Public Utility Regulatory Policies Act (PURPA) became a law. For the first time ever, utilities no longer had a definite monopoly on the production of energy. PURPA allowed "non-utility power producers" access to the grid, and further, it required utilities to purchase power from independent companies that could produce power for cheaper than the avoided costs of the utility for generating the same amount of power.[li] This opened the door not only to limited competition, but the rise in renewable energy as well.

Five years later, Iowa would become the first state to pass a "Renewable Portfolio Standard" (RPS) into law, requiring the state's two main utilities to purchase a total of 105 MW of renewable capacity, which they achieved through wind investments. This was the beginning of the first electricity compliance market.[lii]

In 1992, the National Energy Policy Act would go into effect and create the policy structure for states to deregulate their electricity markets by allowing competitive energy suppliers or "Exempt Wholesale Generators" to operate like utilities, but without the responsibility of managing the grid itself.[liii] Maintenance of transmission would remain the responsibility of what would then be called a "standard-offer utility" AKA the grid operator.

In 1996, New Hampshire would be the first state to take the plunge into deregulation for all classes of customers, including, namely, residential customers. This is where the first ever voluntary green power program emerged by what we now refer to as a competitive supplier.[liv] As many other states were currently in the process of deregulating, environmentalism became a common niche for competitive suppliers to compete for by offering green power options.

At the same time, many states were using all this policy upheaval in the energy space to follow Iowa's early lead by passing "Renewable Portfolio Standards" (RPS) into law, and over the next several years thirteen states otherwise opting to stick with a regulated market would decide to add a "Mandatory Utility Green Power

Option" to their RPS bills.[lv] This would force what are now known as Utility Green Pricing Programs (GPPs) into existence. GPPs are a seamless way for residential and commercial energy consumers to purchase a claim to renewable energy generation directly from their regulated, or "standard-offer," utility. To protect consumers, utilities were not allowed to profit off these new programs; they were required to be revenue neutral. This wasn't a large leap though, since regulated utilities have long been prevented from profiting off of electricity sales directly, and instead are guaranteed a rate of return on generating and transmission infrastructure required to meet customer demand. However, unlike their competitive supplier counterparts, this left little incentive for regulated utilities to market these programs, or even make understanding their terms and costs easy for consumers.

Amid all this green excitement, both a problem and a solution were quickly born. Making green claims is one thing, but certifying them was another. In 1997, Green-e was launched with environmental certification standards for voluntary programs, and in the following year, the first Renewable Energy Certificate (REC) was sold in a green wholesale market.[lvi] On grids where all electrons look the same, RECs themselves were an elegant way of tracking who produced green energy, and who could lay claim to their consumption without any double counting. Each REC represented 1 MWh of green generation, and since green generators sold their electricity to the grid at the same wholesale price all other electricity got, a REC became the mechanism by which they could additionally cash in on the "greenness" of the electricity they produced.[lvii] Not only that, but they could be traded across grids on open markets, enabling investment to flow from places with low renewable potential, to places with high renewable potential, in a similar way that some grids will actually import energy through interconnections to make up for generation shortfalls in their immediate territory.

In 1999, Texas would adopt the REC as the standard unit of RPS compliance, and from there voluntary and compliance-based green generation would become sewn at the hip.[lviii] Many regulated utilities began offering GPPs without a legislative requirement, now that tracking and trading had become administratively simple, since it pleased customers and politicians, even if it wasn't a source of profit. Which has lead us to the point we are at

today with over 850 GPPs in existence reaching well over 60% of the US population. This is where good policy intentions have started to go awry.

"If you build it, they will come" seemed to be the guiding principle behind the mandatory introduction of GPPs with regulated utilities. At the time, no one expected a renewable revolution to occur because the cost of renewable energy was still many times more expensive than it is today. Wind and solar have been falling in price by double digit percentages year over year for over a decade and are now entering a level of price parity the average consumer can actually stomach. GPPs were created for hardcore environmentalists and people who wanted to be pioneers. The hope was that with revenue neutrality, as the price of renewables fell, enrollments would eventually pick up, however they never really did. Now, many scientists even question the ability of green pricing and competitive suppliers to affect REC prices enough to stimulate "additionality" in renewable investment when the decision to build is currently dominated by tax subsidies and the compliance market.[lix] However, the same study notes in it's conclusion, "A significant increase in both the confidence in and magnitude of the voluntary REC market price signal would alter these conclusions." RECs aren't broken, they're just underutilized because of the twin forces of unawareness and indifference.

Lack of Awareness. Although academics have long been interested in consumers' willingness to pay for renewables, almost no research exists about whether consumers are actually aware of, or understand GPPs before they conduct their testing. A 2011 NREL (National Renewable Energy Laboratory) indicated that 14% of customers, when prompted, claimed to be aware of the ability to purchase renewable energy.[lx] However 7% also claimed to purchase green energy, despite utility data revealing that only 1% do, suggesting 14% is likely a substantial overstatement.

Indifference. The same NREL report notes "electricity is such a low involvement category...consumers do not deliberate this decision extensively (if at all) or experience any consequences of their decision." Even among customers *aware* of their ability to purchase renewable energy, why would they unilaterally go out of their way

to spend potentially hours researching options and reading convoluted term sheets only to then spend $5-15 a month that will be unflinchingly absorbed by the economy for a small benefit distributed across all of humanity?

The answer, we believe, lies in stimulating a collective action large enough to create “a significant increase in both the confidence in and magnitude of the voluntary REC market price signal.”

Appendix E: Organizational Connections

Over the course of this project, I've had at least 24 directed conversations with a wide range of experts across over a dozen different organizations. Many of which, I've spoken to on multiple occasions, and most of the remainder I still plan to follow-up with when the time is appropriate. The expertise and perspective they have lent me has been nothing short of invaluable, and has largely made everything else in this report possible. These interviews were not designed to be structured or thematically coded, but creative and exploratory. I contemporaneously documented notes, resources, contacts, and key takeaways that emerged from each interview. These were a few of the most substantial insights received:

1. A national database existed for utility rates at the zip code level through OpenEI.org
2. Focus the message on the personal, local, immediate and shared values. Cultivate media relationships in advance and time press releases to coincide with expected news event.
3. Find ways to assist and connect a national campaign to local grassroots efforts.
4. Effective user testing should be done on strangers, using questions that enforce honesty. DIY testing can be done in public places with paper prototypes and small gift cards.
5. To understand equity, renewables development must be understood on a micro-spatial and transmission level scale. Developers' tactics and economics of farm size play a key role.
6. To understand land-use, renewables need to be contextualized alongside the 35% of corn used for ethanol, as well as the productivity offset provided by co-located pollination.
7. The economics and policy interactions for renewables is very different for utilities, co-ops, and private parties, and both construction speed and grid penetration have dynamic effects.
8. Just because a utility is a co-op, doesn't mean it's democratic or well-managed.
9. There are many paths to advancing the transition, and the paths chosen have a big impact.

And many more. My thanks go out to the Great Plains Institute, the Institute on the Environment, Clean Energy Resource Team, Fresh Energy, Software for Good, Voices for Rural Resilience, Land Stewardship Project, Bee the Change, Clean Up the River Environment, Community Power, Climate Generation, National Renewable Energy

Labs, Environmental Protection Agency, the Midwest Independent System Operator, Xcel Energy, Geronimo, as well as a number of people across different departments at UMN.

Appendix F: Potential Expansions

Building a mass movement around green pricing is the crown jewel of this project, but that doesn't mean there aren't additional opportunities to extend the impacts of the Green Neighbor Challenge while we have people's attention. These additional phases lack the simplicity and "one-size-fits-all" attribute of GPP's, but their impact among a much smaller base of users can still prove substantial. Having these additional future phases in mind will allow us to specifically solicit emails from our most enthusiastic neighbors, which should be not only sufficient, but more appropriate given the limitations of these programs. The three opportunities we currently know of that warrant more investigation are:

1. *Matchmaking farmers/land-owners to renewable energy developers:* The difficulty of this addition would be low, however, the proportion of neighbors with 5 acres or more they're interested in converting is likely also small. This direct referral system however could be lucrative enough to include before the initial rollout. More discussions with developers are needed to determine whether this makes sense as an addition or initial feature (if at all).

2. *Energy Efficiency Programs*: In contrast to GPPs which change the source of electricity, energy efficiency (EE) programs seek to help consumers reduce their energy consumption. Regulated utilities are often required (or incentivised) to offer these programs, though many also make economic sense on their own. They are highly non-standard across states, though resources like DSIRE (Database of State Incentives for Renewables & Efficiency) and state energy offices often aggregate information, making the incorporation of a national search tool potentially feasible. They will however require neighbors to be somewhat motivated since "step-by-step" instructions would be impossible. Although, most health and environmental benefits of EE are negligible after subscribing to a GPP, many programs still generate direct financial savings for users, which only become greater while paying more for green energy. The timing of this effort could have interesting side-effects of either reducing the demand for green generation among our neighbors, or, if infrastructure has had time to be built, actually reduce aggregate

demand for electricity, accelerating the retirement of fuel-based generation (which carries a higher marginal cost.)

3. *Distributed & (REC-friendly) Community Solar*: Some utilities have distributed solar incentive programs that assist and subsidize consumers in setting up their own solar arrays on their rooftops. So not only do these programs require a home, but also a substantial upfront investment that may take well over a decade to generate a return on investment. Distributed solar does however immediately begin offsetting your own energy costs, and for utilities with "net metering" systems in place, solar owners receive a credit for any unused energy put back onto the grid.

   Community Solar operates in a similar way, however rather than requiring a home, a Community Solar "subscriber" purchases an equity share of a solar farm located elsewhere, which still generates credits on your bill. While community solar arrangements are often easier and more financially efficient than distributed solar, few community solar projects allow subscribers to retain the Renewable Energy Certificates generated by the project, so any effort to match neighbors to projects will require proper vetting.

Appendix G: Campaign Strategies

Through intuition, iteration, feedback, and reflection, we've developed five strategies for overcoming the two primary barriers to GPP adoption, *awareness* and *indifference*. Several of these concepts emerged during experiences either at or in preparation for the Boreas Speaking Science Conference. They were further refined through an Acara Case Consultation and judging in both the Acara Challenge and UMN Sustainability Expo, then later firmed up with additional literature review.

- Storytelling: The work of Doug Cloud on "communicating controversial science" highlights four key principles: take a broad view of "argument," pivot towards shared values, make your science "present", and seek identification with your audience.[lxi] When we talk about climate, we walk through a political minefield, appealing to distant fears, inevitably waxing towards "facts" and moralisms. When I tell you about the terror I felt as a child waking up to asthma attacks and the very real costs to the health of our loved ones and wallets that pollution has today, we connect in a much more personal way where we can talk about choices and hopes.

  The NREL report on consumer attitudes emphasized as much in 2011: "One strategy to grow renewable energy usage... would be to better promote the health and economic benefits, since this would widen the target audience, and it is easier to reposition a product to be relevant to consumers than it is to convince them of its relevance." This is important, because *our neighbors are everyone with a utility bill*.

- Social Identity: At the Speaking Science Conference (UMN, Jan 2019), Dr. Amanda Stanley said, "when you ask someone to change their mind, you ask them to change who they are." Beliefs aren't rooted in fact, but rooted in identity… even for those who construct an identity around "facts." We are social creatures. Our identities are reflective of those who we keep as company, even when we keep organizations as company. "Environmentalists" are not only the first and most obvious identity to reach, but they tend to be well connected to non-profits that reflect their values.

Rather than centralizing the campaign around whatever organizational container houses the Green Neighbor Challenge, our reach will be far greater if we organize a good ground game at the grassroots. That means reaching out, building relationships, providing materials, and supporting a wide-range of organizations to mobilize their membership around the Green Neighbor Challenge simultaneously. This will allow a plurality of stories to develop and propagate across social networks and communities in ways that no "direct marketing" campaign ever could.

- Technology: The Green Neighbor Challenge will be largely facilitated through massively popular and massively concentrated social media platforms. Technology itself has enabled the rapid collection of national data and will enable a single central tool to be built from that data. If initial user indifference can be overcome, social media will then allow the Green Neighbor Challenge to follow the path of least resistance, and allow individual messaging to evolve across networks until the point where diminishing returns meet increasing resistance.

  The eventual magnitude of such an effort is impossible to judge. Like any intervention in a complex adaptive system, we aim to inject as many virtuous qualities before we let it run its course. A decent analogy for how this campaign will operate is a forest fire. At small scales, it is fickle; susceptible to fire breaks. At large scales it takes on a momentum of its own, becoming able to jump, go around, or simply suck the moisture out of obstacle. But like a forest fire, it's highly unlikely to double-back upon itself. While many well-intentioned interviewees have suggested the idea of a localized or regional pilot, the national scope is a critical asset upfront because networks gain their most emergent properties out of loose connections. It's not the 95% of people I know who live here that are unpredictable; it's the 5% I know who moved across the country, like an ember carried by the wind across the river.

- Behavioral Economics: The Green Neighbor Challenge is not an app. It's more like an event, or resource. Neighbors don't create accounts, we simply help them change the nature of their relationship with their utility. Personally identifying information isn't collected unless a neighbor opts to share their email or

follow one of our social media accounts. This is done because it's ethical, easier, transparent, and makes us more trustworthy (and shareable). But also because if there is a phase 2 or 3, we should only require the help of our most enthusiastic neighbors to roll those out.

While we draw inspiration from the Ice Bucket Challenge, this design has the potential for a much larger and more persistent effect. When a neighbor signs up for a Green Pricing Program, they are signing up for a small increase in existing recurring payments. Increases so small that the first one can be easily offset by a combination of the "warm glow effect"[lxii] and the social rewards, while the remainder are likely to be forgotten as neighbors slip back into the same indifference they've always felt about their utility. Though we are loss averse, these small losses occur at the edge of our marginal utility, where we don't even realize we're giving something up.

This consistency from the industry perspective is far more bankable than the faddish purchase of unbundled REC's by businesses looking for a new marketing claim to slap on a product. From rough calculations, moving green pricing subscriptions up from 2% to 4% would inject $168MM per year into green generation. This cash flow can be leveraged into capital investments many factors larger and amortized over their lifetime.[lxiii]

- Spectacle: It seems these days the easiest way to make the news is to 1) get a large group of people doing anything and 2) have already written the coverage yourself. When a large number of people begin signing up for GPPs, we intend to have the press packet ready. When a large number of people begin sending letters to their public utilities commission and state representatives demanding a GPP be added, or enrollment be expanded, we'll also have the press packet ready. We intend to provide neighbors form letters if they encounter an issue while signing up, and we also intend to prepare a response for a variety of contingencies. Some of this is speculative, but if successful, this will help take the conversation beyond social media to reach neighbors who prefer to get their information from the paper or local newscaster.

Appendix H: Tool Design

Designing the web-tool for the Green Neighbor Challenge requires striking a balance between having a ruthlessly efficient functional design, elegantly minimalist information design, and emotionally evocative visual design. A very simple mockup was produced early on to demonstrate the core user functionality using Google Presentation, much like a simple "paper prototype." From there, two progressively more robust, interactive prototypes were designed in Powerpoint using the hyperlinking feature of objects to create working buttons that allow a user to navigate pages in a web-like simulation, but in a PDF format. This third iteration included interactive FAQ's, as well as introducing users to a suite of additional functionality (and action) our users might be able to take after completing the core task of finding and signing up for a green pricing program.

These prototypes have been presented to friends and interviewees, and the most recent one to students at the UMN Sustainability Expo, incorporating feedback at each progressive stage. The next step is to take the prototype out into the world and conduct UX (user experience) and tactical communications testing on actual strangers of different demographic groups to see what further improvements can be made. In the meantime, four domains have been registered and setup with hosting using the Wordpress platform for sheer ease of use. As an additional step, Elliott Rezny, who is both a longtime friend and coder out in San Francisco, has volunteered his time to develop the back-end functionality of the core lookup features of the site in a way that is both portable to Wordpress (using REACT), and easily updated via GitHub by a non-coder.

Functional Design

At its core, the website flow has four main steps. First a user enters their zip code. Second, they are returned a list of utilities (if more than one operate in a given zip code) to select the relevant one. Third, they are presented with the different green pricing programs available to to them, and a brief list of key facts about each including energy mix, estimated cost, and contract length. Once they select the program they are most interested in, they are finally presented with a list of directions and links in order to sign up. When they've completed signing up,

the button at the bottom of the page will allow the user to share the webtool on a variety of social media platforms, and then examine other ways they can take action, should they desire. (See Figure 4)

Figure 4: Mockup of GNC website, primary steps in user experience

Many users will only have a single program to choose from, and we expect about 30% of the US population will not have a program available to them through their utility. For these users without a program, we intend to give them the ability to send a customizable letter to their utility, state representative, and public utilities commission, if applicable, requesting a green pricing option be added (and potentially other optional policy prescriptions). Those users would also have the option to skip this step and share the tool, as well as examine other ways they can take action. In this way, we aim to make this tool useful to everyone with a utility bill, and even some without.

The range of additional actions we've both brainstormed and received in feedback include:

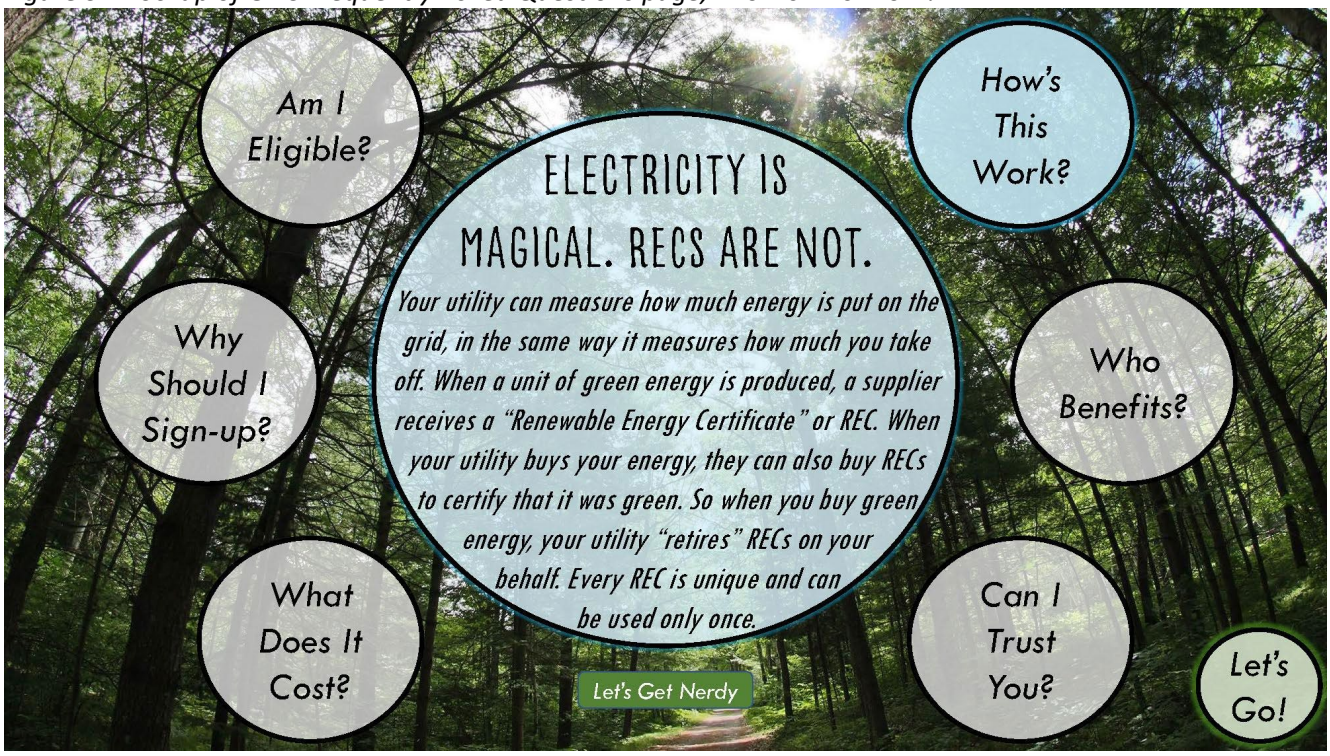
1. Sign up for email newsletters (with tips and educational content)
2. Follow us on social media platforms
3. The ability to donate money directly
4. The ability to purchase stickers, signs, shirts, clings, and other merchandise

5. The ability to petition elected representatives for sensible clean energy reform
6. The ability to download and print materials and resources for whether you want to share information with family during the holidays or organize a local door knocking campaign.
7. For users with 10 acres of land or more, providing resources and a referral to solar developers in your area.

Information Design

Among the first criticisms this project received (which was repeated by multiple different experts) was that green pricing programs/renewable energy certificates were "too confusing" for consumers. Indeed energy policy is a complex topic in academia. However, small sacrifices in precision can go a very long way in making concepts accessible to the layperson. (See Figure 5)

Figure 5: Mockup of GNC Frequently Asked Questions page, "How's This Work?"



Through my many interactions, I paid attention to where people were most often tripped up, or otherwise concerned about. I attempted to distill their confusion into seven simple questions, and for each, provide as straightforward an explanation as I could. Giving myself a visual space and font size constraint, I then edited those responses down, removing as unnecessary words and simplifying further where I could. Much of this had

been made easier through repeated applications and conversational practice, so of the seven responses, they average around 78 words (4.8 characters/word) and 446 characters in length (well under two tweets, with room for URLs to spare). While they've not yet been tested on non-students, the response has been positive so far. We hope to be able to supplement each of these (often pithy) responses with a 1-2 minute explainer video that can go into more depth with a narrator and illustrations/animations. The questions tackled in the FAQ are:

1. What's this about?
2. Am I eligible?
3. Why should I sign-up?
4. What does it cost?
5. How's this work?
6. Who Benefits?
7. Can I Trust You?

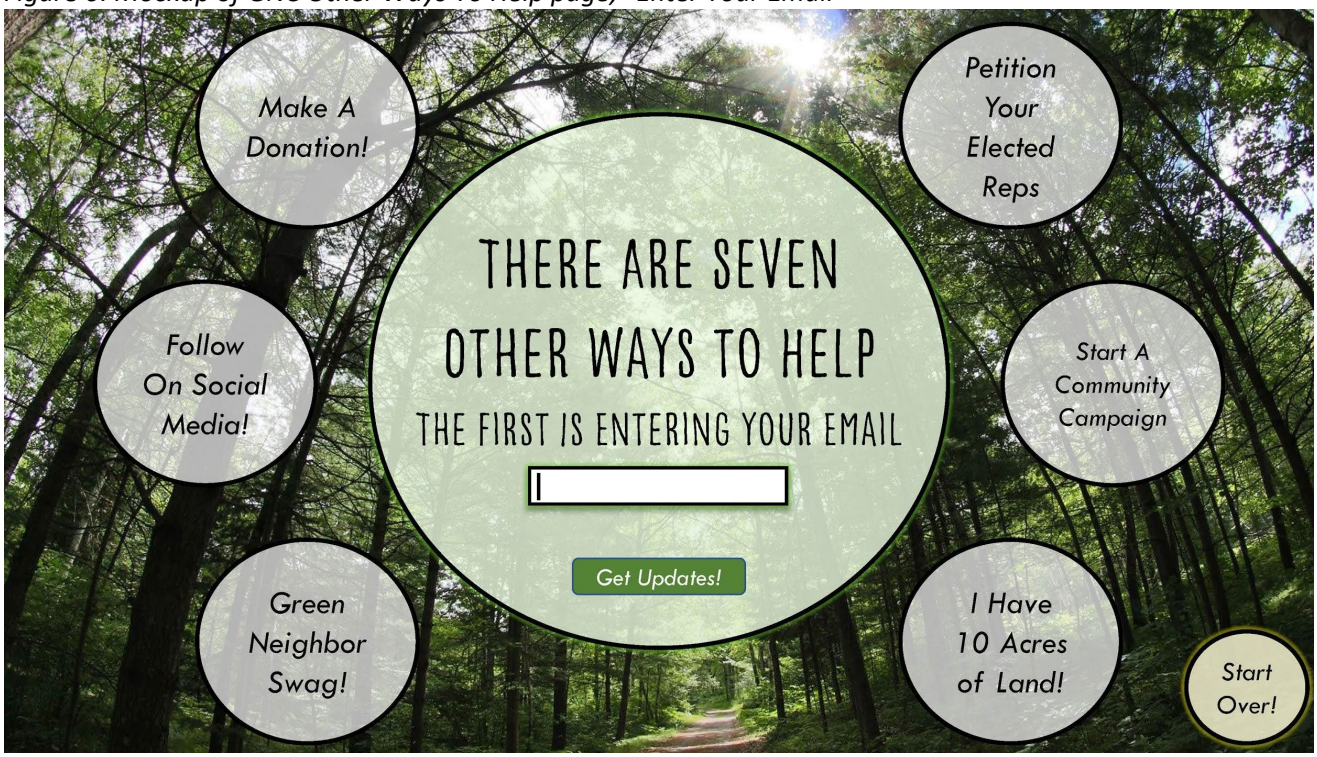
Visual Design

While most web pages scroll vertically and organize themselves with a horizontal or vertical navigation bar to allow for a very non-linear experience, since the Green Neighbor Challenge is more of a process, it made sense to make it a short series of static (non-scrolling pages). This allows the interface to both stand out as visually minimalist (featuring evocative natural photography as a backdrop), as well help guide the user through the process more quickly like an application would. A circular design motif was used in the latest design iteration, since circles are more inviting than corners and edges, they are often associated with nature and sustainability, and through the use of varying size, can help direct a user's attention in a specific order across a page. Two small circle buttons were placed in the corner to allow users to jump to the FAQ's or Other Ways to Help more quickly (in case they had previously visited the website, and were returning.)

Given this preference for non-scrolling pages, this created a small design issue. FAQ's usually take the form of a list, often with expanding and contracting "accordion" content, as the user clicks. To make the FAQ's feel more accessible, the circular design actually allowed for a static page where smaller question bubbles could be arranged around a larger central answer bubble. This design would only allow one answer to be displayed at a

time, but while a user was on the FAQ page, questions and answers could be explored in any order. This same page design immediately became useful in reducing the “seven additional ways to help” down to a single, relatively uncluttered page as well. (See Figure 6) In this way, the website itself exists across is perceived to be as few as six pages. Overall, these visual designs help turn simple functions and simple messages into simple and intuitive forms. We expect future user testing will help us test and refine these concepts further.

Figure 6: Mockup of GNC Other Ways To Help page, “Enter Your Email”



Appendix I: Expected Impacts

The environmental impacts of the Green Neighbor Challenge are clear: 28% of US carbon emissions come from electricity. As transportation (28%) and heating (8%) move towards electrification, over half of our current carbon footprint depends on green generation for decarbonization. With green generation currently sitting at 17%, and only a quarter of that represented by voluntary procurement programs, the Green Neighbor Challenge has the ability to make a dent in a big way. If we can take subscriptions from 2% enrollment to 4% or 10% or 20%, we will meaningfully disrupt US emissions and even put a dent in the world's.

Likewise, the social benefits are also clear: At the scale of change we're hoping to achieve, thousands of lives can be saved. Thousands more will see the severity of their illness reduced. The harmful effects of sulphur and mercury can be abated in our lakes, rivers, and waterways. Our public health can improve even as our healthcare costs drop. Clean energy is the epitome of preventative care. And in an age where "climate grief" has become an accepted clinical term,[lxiv] giving people a new source of agency over their future stands to benefit our mental health too.

The economic benefits are also clear: As both the EPA and the Lancet highlight, our health directly impacts our broader economy. Ambient air pollution has reduced our GDP by an estimated 5.5%.[lxv] In terms of the cost, wind and solar are already the lowest cost generation in many areas for base and peak energy respectively; what prevents an immediate transition are the mutual challenges of upfront capital (for new infrastructure) and sunk costs (of old infrastructure). In this way, the green energy transition is inevitable, but with 11 years to act, the Green Neighbor Challenge aims to shove an already rolling boulder off the metaphorical cliff. Every year, every month, and every life matters.

Going beyond a mere economic benefit, it's also important to examine the distributional effects of the Green Neighbor Challenge. If all the economic benefits of a green energy transition were to be captured simply by the entrenched utilities, this whole effort would be worth pause. Fortunately, while most utilities make money on investments, their frustrating attachment to fossil fuels is an asset in this case. NREL found that 95% of Green

Pricing Program procurement came from projects not owned by the utility.[lxvi] This suggests that a vast majority of these purchases are coming from 3rd party developments (though some third parties could be other utilities with generation above RPS), and given that wind and solar resources are inherently more spatially distributed than fossil fuel infrastructure (with a single wind development sometimes benefitting hundreds of parcels of land), the economic benefits should also be more distributed than they were before (even if they're not as distributed as they could be). Further, because poor and minority communities are already disproportionately impacted by fossil fuel infrastructure, reductions to pollution and decommissioning *should* also disproportionately restore the right to health in these communities.[lxvii]

Appendix J: Potential Criticisms

Many potential criticisms have been lobbed at the project as well. While regulated utilities do not directly benefit from electricity sales, if they do jump through the regulatory hurdles to build more green generation, they certainly could reap fixed returns, and competitive suppliers undoubtedly will. Neither of these reduce the social benefits however, which by 2050 may actually be 50% larger than the business cost of energy itself.[lxviii]

Another common criticism is that voluntary RECs may not actually lead to additional generation given their low prices and overlap with much larger compliance markets. As mentioned above, the author who has published the most on this equivocates in his most recent conclusion about how the relationship of voluntary REC prices to compliance REC prices is not fully understood, and given a significant change in either the magnitude or confidence of the REC market could completely alter his [historical] findings.

The third most common criticism is usually an appeal to increase renewable portfolio standards or boosting community solar subscriptions instead. Increasing RPSs, while theoretically expedient: 1) lacks a clear point of leverage for those in political poverty, 2) could actually be expedited by a mass movement around GPPs, and 3) would very likely further entrench the ownership structure of existing utilities. Correspondingly, community solar subscriptions: 1) do not suffer from the profit-motive mismatch that GPPs do, 2) are still largely accessible only to those with pre-existing wealth, and critically 3) only about 10% of solar gardens actually retain and retire RECs produced on behalf of subscribers. This third point could depress the price of RECs (by simultaneously increasing supply and reducing demand) for compliance to the point where we actually become wholly dependent on RPSs or the falling price of renewables to steward us to a complete green energy transition, at which point our transition will almost certainly be too little, too late.

Appendix K: Next Steps

Where do we go from here? This is our plan:

1. UX/Tactical Communications Testing - With our latest prototype in tow, we intend to reconnect with Daniel Card and David Rosen to recruit some undergraduate assistance in designing UX and tactical communications testing in three locations, one urban, one rural, one farmer's market. We hope to gain feedback on both how the messaging is received as well as how intuitively our interface has been designed.

2. Continuing Building the Database - While completing the database was initially a high priority, the length of the project has been extended to improve the quality and scope, introducing concerns over maintaining the accuracy of the data. In order to reduce the number of updates required before launch, collection of specific details such as cost and instructions will occur much closer to the launch of the tool. Members of Science for the People and others have offered to help make light work of this in a series of hack-a-thon style "research parties."

3. Filing for non-profit status - Slowly but surely, the benefits of establishing tax-exempt non-profit status have overwhelmed the alternative. Given the long lead-time in receiving approval, and the desire to start soliciting donations as soon as possible, this is high on our to do list.

4. Making more connections - Throughout the summer and into the Fall, we will aim to continue reaching out and building relationships with like-minded non-profits, particularly those with a large membership or social media following. Additionally, we'll assess the viability of connecting with large metro municipal departments that may have an interest in helping spread the tool and at least a few journalists interested in writing stories. Establishing these relationships in an orderly fashion should make organizing the launch of the campaign easier, and give organizations time to work the launch into their own marketing/messaging strategies, as well as grow comfortable in partnership with us, potentially finding ways to contribute along the way.

5. Competitions/Grants - With two in the bag, we've set our sights on two additional opportunities, the Minnesota Cup and the Finnovation Fellowship. The former is a statewide venture competition sponsored by the MN department of employment and economic development (DEED), and the latter is a social venture incubator hosted by the Minneapolis-based Finnegans Brewing, and funded by the Bush Foundation. We'll be keeping our eyes peeled for additional funding opportunities to accelerate our work.

6. Soliciting Donations (& Hiring Staff) - Hopefully by Fall, with substantial user testing and web development in tow, we will be able to successfully begin soliciting donations from interested parties that stand to benefit from a boost in green energy and REC demand. Given that a 2% increase in enrollment would shift about $168 million toward green generation annually, we think it possible raise $400,000+ from developers alone, which could support hiring on several people to the team for dedicated support.

7. Completing the Website - Obviously finishing the website will be required before launch, but considerable uncertainty exists as to how many features we'll aim to include at launch. We hope user testing will help clarify that for us, and with a larger pool of money to draw from, our first hire to the team will undoubtedly be a technical lead. Unlike an app, most of our traffic will interact with us only once. This means there is a much higher premium on including all the most essential features before launch.

8. Launching the Campaign - Last but not least is the launch. A complete media strategy will need to be planned in advance, as we hope to hit the ground running. It seems likely we will use a very soft launch for a short period to hopefully catch any bugs before a week-long media blitz by all our partnered organizations, as well as the publication of any related articles. It may be valuable to time this media-blitz with some anticipated event related to health or climate to harness people's attention.[lxix]

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